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"The Isolation and Characterization of Human Prostate Cancer Stem Cells"

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CONTRACTING ORGANIZATION:

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14. ABSTRACT The overall objective of this proposal is to develop a durable cure for lethal prostate cancer through the elucidation of the role of cancer stem cells in the pathogenesis of the disease. During the past year, we have made the following significant findings/observations: i)3D culture of human prostate cancer cells with magnetic nanoparticles is not optimal for tumor initiation studies, ii) in vitro co-culture of human prostate cancer cells (established cell lines and primary patient samples) with human prostate fibroblasts hold promise as models of tumor initiation/cancer stem cell activity. We continue to optimize and validate our in vitro model of prostate cancer initiation to facilitate cancer stem cell discovery as well as drug targeting.					
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Introduction

The overarching goal of this proposal is to develop a durable cure for men with advanced prostate cancer through an improved understanding of the role of human prostate cancer stem cells in the pathogenesis of the disease. To this end, we have proposed the following specific aims: **1)** to identify and prospectively isolate prostate cancer stem cells from human prostate cancer tissue, **2)** to examine human prostate cancer cell lines, both primary and established, for cells that express cancer stem cell surface markers and the ability to determine therapy resistance *in vitro*, and **3)** to develop an *in vivo* model to assess human prostate cancer stem cell targeted therapy. The elucidation of the differential biology of cancer stem cells, versus the bulk population of cancer cells, has the potential to lead to the identification of novel therapeutic targets that aim to cripple the driving force behind lethal prostate cancer.

Body

The time period from 29 JAN 2012 - 28 JAN 2013 was a time of transition for our lab. In April of 2012 I was offered and accepted a position at the University of Michigan Medical School in the Department of Urology as Associate Professor, Chief of Urologic Oncology and The George F. and Sandy G. Valassis Professor of Urology. The DoD was made aware of my transition from The Methodist Hospital to the University of Michigan. From May 2012-June 2012 we prepared for transitioning our lab from Houston, Texas to Ann Arbor, Michigan. My official start date at the University of Michigan was October 1st, 2012. Upon starting, I began the process of setting up the lab. As of 28 JAN 2013 we were just getting personnel hired and starting the process of obtaining all necessary credentials to begin laboratory lab operations at the University of Michigan.

No significant work was completed on the proposed statement of work during this period.

We have received an extension to complete this award thru February 2015.

Key Research and Training Accomplishments

Research accomplishments:

None this past year

Training accomplishments:

- Attend prostate cancer research seminars bi-weekly
- Attend monthly prostate SPORE research meetings monthly
- Attend UM Cancer Center research seminars monthly

Notable happenings: Over this period our lab relocated to The University of Michigan Medical School. Our new research space is located in the University of Michigan Comprehensive Cancer Center and is composed of 8 benches with dedicated space for cell culture and fluorescent microscopy. Further, our area is contiguous with the larger prostate cancer research group with full access to all major equipment.

Reportable Outcomes

1. Manuscripts

Qin J, Liu X, Laffin B, Chen X, Choy G, Jeter CR, Calhoun-Davis T, Li H, **Palapattu GS**, Pang S, Lin K, Huang J, Ivanov I, Li W, Suraneni MV, Tang DG. [The PSA\(-/lo\) Prostate Cancer Cell Population Harbors Self-Renewing Long-Term Tumor-Propagating Cells that Resist Castration.](#) *Cell Stem Cell*, 10(5):556-69, 2012. PMID: PMC3348510

This work was made possible thru collaborations I made as part of this DoD training award.

2. Funding

U01-CA-167234 (Palapattu/Sreekumar) 08/01/2012 – 7/31/2017

Baylor College of Medicine

NIH/NCI

Metabolomic Profiling and Biological Basis of Racial Disparity in Prostate Cancer

The goal of this proposal is to address differential biological processes associated with prostate cancer and benign adjacent tissues in AA and EA men. Metabolic signatures will inform functional studies as well as biomarker discovery/validation studies in urine.

Role: PI (multi-PI)

Also, in November 2012 I was selected to serve as co-PI of the UM Prostate SPORE P50 CA69568

Conclusion

From the work completed thus far, we conclude that i) 3D culture of human prostate cancer cells with magnetic nanoparticles is not optimal for tumor initiation studies, ii) in vitro co-culture of human prostate cancer cells (established cell lines and primary patient samples) with human prostate fibroblasts hold promise as models of tumor initiation/cancer stem cell activity.

References

None

None